

NEW ENGLAND CONSTRUCTION



AECOM Upgrades Connecticut Water's Oldest Surface Plant

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Aerial view shows hydraulic Bay Crane passing materials to crews inside DAF tanks of new building, while at right is partially built Spent Washwater Tank.

AECOM Design-Build Project Boosts Capacity and Efficiency of Rockville Water Treatment Plant

By Paul Fournier



Connecticut Water's oldest surface water treatment plant is undergoing a \$28 million upgrade by AECOM, the nation's second largest engineering and construction company, and RH White, one of New England's oldest construction companies (established 1923).

AECOM has a design-build contract with Connecticut Water to replace the outdated treatment process at Rockville Water Treatment Plant (RWTP) in Vernon with an advanced technology that promises greater efficiency and capacity. AECOM, formerly known as AECOM Technology Corp., had \$18 billion of revenue during fiscal year 2015.

Connecticut Water is a wholly owned public water utility subsidiary of Connecticut Water Service Inc., which also owns Maine Water Company. The parent company is the largest publicly traded water company based in New England, with total revenues of \$103.1 million in 2015 and net income of \$22.8 million. Currently the company provides drinking water to nearly 124,000 customers, or about 400,000 people, throughout the states of Connecticut and Maine.

A 50-Year Fix

Connecticut Water's Rockville treatment plant, located in Vernon near the Hockanum River and Lake Shenipsit Reservoir, has operated continuously since 1970. Designed with a maximum capacity of 6 million gallons per day (mgd), the treatment plant provides part of the supply for approximately 85,000 people in 10 communities in the northern part of the state. Major improvements were made to



Ready mix is placed for floor slab by HOP River crew, which is responsible for forming and placing about 4,000 cubic yards of concrete for the job.

the plant in the 1980's and 1990's to meet ever-stricter water quality standards of the Safe Drinking Water Act. According to the water company, the latest improvements will enhance treatment, increase maximum capacity to 9 mgd, and produce greater operating efficiencies and reliability. These upgrades will enable the plant to meet water supply needs for the 50-year planning period mandated by the Connecticut Department of Public Health.

A \$60M Investment for 2016

The Rockville plant was one of two major construction projects launched by Connecticut Water in 2015, the other being a pipeline to provide water to the Mansfield/UConn area. All told, in 2015 the company invested more than \$42 million in projects including water treatment, replacing aging pipeline, and cyber security. The latter is designed to protect sensitive data on its

computer systems.

In addition, the company upgraded more than 9 miles of old water mains across the state, some close to 100 years old, at a cost of about \$19 million under its Water Infrastructure and Conservation Adjustment (WICA) program. Since the inception of WICA in 2008, the company has spent about \$105 million replacing some 80 miles of old and undersized water mains, or about 5 percent of its 1,600-mile distribution system.

The utility said it plans to spend close to \$60 million in 2016 to further enhance system reliability, water quality, public fire protection, and protection of sensitive data. This capital investment also pays for continued construction of the Rockville Water Treatment Plant, the Mansfield/UConn water pipeline, the cyber security initiative, and provides \$18 million for 16 pipeline projects across the state.



Modern Concrete Pumping's 45-meter Schwing delivers ready mix from Builders Concrete East transit mixer to crews placing tank walls.



Construction team leaders, from left: RH White Project Manager Jamey Pedro; AECOM Project Manager Jim Mitchell, Construction Manager Steve Small, and Project Engineer Tom Herer; and Connecticut Water Company Construction Manager Nick Meder.

Design Build Project Gets Underway

Construction of the updated plant began in October 2015. AECOM is the prime contractor, with RH White serving as general contractor. Team leaders for the project include Jim Mitchell, P.E., AECOM Project Manager; Steve Small, AECOM Construction Manager; Tom Herer, AECOM Project Engineer; Jamey Pedro, RH White Project Manager; and Nick Meder, Connecticut Water Construction Manager. The other major company team members for the design-build delivery system are Electrical Energy Systems, B-G Mechanical (plumbing and HVAC), NIC Systems (instrumentation and controls), Coreslab (precast exterior panels), XYLEM (process equipment), and Chemco (dry chemical silos).

Work began with tree and brush clearing at the site by Northern Landclearing. An engineering survey had indicated the presence of significant ledge at the site, with ultimately about 9,000 cubic yards of rock having to be shattered. This was done by Bay State Blasting either by drilling and blasting or using excavator-mounted hydraulic hammers. Callahan and Montalto performed general site work and excavation and yard piping installation under a subcontract with RH White. The site contractor is installing hundreds of linear feet of 8-inch to 24-inch ductile iron pipe plus some small-diameter PVC pipe.

Approximately 4,000 cubic yards of ready mix for the tanks, foundations and all other cast-in-place structures are being provided by Builders Concrete East, with Hop River Concrete doing the forming and concrete placement. The concrete sub is employing Doka forms, while reinforcing steel is supplied by Harris Rebar. Ready mix is conveyed to the Hop River placement crew by a 45-meter Schwing pump operated by Modern Concrete Pumping.

Several manufacturers are providing precast concrete structures for the treatment plant, including Coreslab (tilt-up exterior wall panels), Oldcastle (6,000-gallon tank), and United Concrete (miscellaneous precast structures).

Spring 2017 Startup Targeted

According to Mitchell, the project schedule calls for building construction to be completed in summer 2016, process equipment to be installed in fall 2016, and electrical, HVAC and plumbing to be completed during the 2016/2017 winter season. Plant startup and acceptance test are slated for spring 2017. 🚧



A JLG G9-43A Telehandler transports a bundle of rebar to a concrete slab construction area.

Building Incorporates Both Precast and CIP

Connecticut Water's new treatment building is a split-level facility measuring roughly 172 feet by 127 feet with precast concrete panel walls, cast-in-place concrete tanks and foundations, and a metal roof with a PVC membrane. This half-acre structure houses a workshop, administrative offices, control room, conference room, laboratory, loading dock and chemical storage area. A process deck and pipe gallery overlook the GAC filters plus the concrete Flocculation/DAF tanks. DAF tanks are sizeable structures, measuring up to 24 feet tall and covering about 30 percent of the building's footprint. There are also two large, subsurface cast-in-place concrete tanks located outside the building proper. Each is about 17 feet tall, with the Back Wash tank measuring approximately 50 feet by 75 feet, and the Spent Wash Water tank measuring about 50 feet by 90 feet.

The Source

Raw water for the Rockville plant is drawn from Connecticut Water's Lake Shenipsit Reservoir, located in the towns of Ellington, Tolland and Vernon. This important public water supply source has a storage volume of more than 5 billion gallons, a maximum depth of 68 feet, and an approved safe yield of 10 mgd, much more than the company's current average daily withdrawal of 4 mgd. The company noted that it has historically maintained and protected flows in the Hockanum River through downstream releases made from Lake Shenipsit, and that these flows will be maintained and the Hockanum protected by complying with current release requirements and the State's streamflow regulations. Since 1994, the reservoir area has been open to fishing and hiking under a Department of Public Health-approved Recreation Program sponsored by Connecticut Water and the Shenipsit Lake Association.

Tiny Bubbles Make It Work

The updated Rockville plant will employ dissolved air flotation treatment (DAF) technology. In this process, raw water is pumped into a flocculation tank where tiny solid particles in the water coalesce into small suspended clumps or loose clusters. Effluent from the flocculation tank enters the DAF tank, from which some of the effluent is pumped into a saturation tank where compressed air is introduced. This air-saturated effluent is recycled to the front of the DAF tank where the air is released in the form of tiny bubbles. Bubbles stick to the particle clusters like tiny buoys, lifting the suspended clusters to the top of the DAF tank where they are skimmed off and sent to a sludge pump station. Sludge is pumped into sludge basins or drying beds. The clarified effluent leaving the DAF tank undergoes final treatment by granulated active carbon media filters before entering the existing plant's three service storage tanks.



Bay Crane hoists a Doka Frami Xlife concrete form for tank wall pour.